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EDITED BY THE

REV. G. R. GLEIG, M.A.,

INSPECTOR-GENERAL OF MILITARY SCHOOLS.

A

C L A S S - A T L A S

OF

PHYSICAL GEOGRAPHY.

BY

WALTER M^cLEOD, F.R.G.S., M.R.C.P.

HEAD MASTER OF THE MODEL SCHOOL, AND MASTER OF MATHS IN THE
ROYAL MILITARY ASYLUM, CHULSEA.

LONDON:

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A
C L A S S - A T L A S
OF
PHYSICAL GEOGRAPHY:

COMPRISING
20 MAPS AND 10 SECTIONS AND DIAGRAMS,
WITH
NOTES ON THE MAPS.

BY
WALTER M^CLEOD, F.R.G.S.,
HEAD MASTER, MODEL SCHOOL, ROYAL MILITARY ASYLUM, CHELSEA.

Author of
"HAND-ATLAS OF GENERAL GEOGRAPHY;" "ATLAS OF SCRIPTURE GEOGRAPHY;"
"GEOGRAPHY OF PALESTINE OR THE HOLY LAND;"
ETC. ETC.

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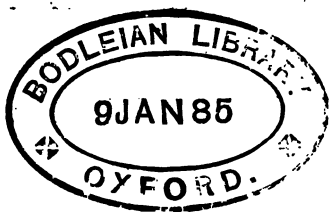


TABLE OF CONTENTS.

Plate

- I. THE WORLD ON THE PLANE OF THE HORIZON OF LONDON.**
- II. SECTION OF THE EARTH'S CRUST SHOWING THE GEOLOGICAL FORMATIONS, ETC.**
- III. PHYSICAL MAP OF EUROPE.**
Section from Gibraltar to the Plains of Russia.
- IV. PHYSICAL MAP OF THE BRITISH ISLES.**
(a) Section from C. Wrath to the Cheviot Hills.
(b) Section from Wales to Suffolk.
- V. PHYSICAL MAP OF ASIA.**
Section from C. Comorin to the Plains of Siberia.
- VI. PHYSICAL MAP OF NORTH AMERICA.**
Section from the Pacific to the Atlantic Ocean.
- VII. PHYSICAL MAP OF SOUTH AMERICA.**
Section from the Pacific to the Atlantic Ocean.
- VIII. PHYSICAL MAP OF AFRICA.**
PHYSICAL MAP OF AUSTRALIA, &c.
- IX. Comparative Heights of the Principal Mountains, and Elevation of the Snow-line arranged according to Latitude.**

Plate

- X. Distribution of Active Volcanoes, and the Regions visited by Earthquakes.
- XI. Geographical Distribution of the most useful Minerals.
Forms of Mountains.
- XII. Map showing the Mean Annual Temperature: the River Systems and Ocean Currents of the World.
Comparative Lengths of the principal Rivers.
- XIII. Isothermal Lines of the Month of January.
Mean Winter and Summer Temperature of some of the principal places in the Northern Hemisphere.
- XIV. Isothermal Lines of the Month of July.
Mean Winter and Summer Temperature of some of the principal Places in the Southern Hemisphere.
- XV. Map showing the Distribution of the Winds.
Classification of Winds according to Velocity.
- XVI. Map showing the Distribution of Rain and Snow over the World.
Section of a Hill showing the Formation of Springs.
- XVII. Geographical Distribution and Limits of Cultivation of some of the principal Plants most useful to Man.
Zones of Vegetation, with the characteristic Vegetation and Mean Annual Temperature of each Zone.
- XVIII. Geographical Distribution and Range of some of the principal Members of the Animal Kingdom.
Lagoon Island or Atoll.
- XIX. Vertical Distribution of Plants and Animals.
- XX. Distribution of the leading Races of Men.

NOTES ON THE MAPS.

MAP I.

This map is projected on the plane of the horizon of London, and shows what may be termed a *water hemisphere* and a *land hemisphere*. London stands almost in the centre of the latter hemisphere, which includes nearly all the land on the globe.

PLATE II.

This plate gives a section of the Earth's crust, exhibiting at one view the different formations, groups, and systems, and is adapted to all the best Treatises on Geology. Although Geological terms are frequently used in Physical Geographies, no School-Atlas contains any map or diagram relating to this important subject.

It will be seen, on examining the Plate, that there are *Eleven Systems* *, which comprise a great number of groups of rocks; the lowest system being termed *Metamorphic*, and the upper, *Post Tertiary*.† These are again arranged into *Epochs* or *Formations*, which receive names from the absence, presence, or dates of the forms of life exhibited by the organic remains found in the strata. Thus the strata which contain no organic remains are termed *azoic* (without life); and *Hyposoic* (beneath life), because they lie below the range of all

* The Silurian and Cambrian are, by some, made to form *one system*.—The Silurian.

† The Upper, Middle, and Lower Tertiary form *one system*.—The Tertiary.

organic remains. The name *palæozoic* (ancient life) is applied to the most ancient strata; the middle strata are termed *mesozoic* (middle life); and the most recent strata, *cainozoic* (new life).

The three latter formations are also called *Fossiliferous Rocks*, because they contain, less or more, the remains of plants and animals, whilst the *Metamorphic Rocks* are termed *Non-fossiliferous*, because they appear to be devoid of fossils. These rocks also receive the name of *Stratified**, because they are generally arranged in *layers* or *strata*.

The *Igneous Rocks* appear to have been formed by the action of intense *heat* or *fire*, in the interior of the earth; and as they were not produced by the gradual accumulations of strata, but by the fusion of the minerals composing them, which afterwards cooled into one solid mass, they are called *Unstratified Rocks*.

Granite, porphyry, basalt, and volcanic products, such as lava, pumice, &c., are examples of igneous rocks, which have been thus classified:— 1. Granitic. 2. Trappean. 3. Volcanic Rocks. The most widely diffused of these is granite, which is found not only in extensive mountain ranges, but is also the deepest seated of all known rocks, underlying them and forming the foundation on which all other rocks rest.

MAPS III. TO IX.

These maps show the direction of the great mountain systems, with their culminating points; the position of the plateaus and table lands; the directions of the rivers; and the comparative heights of the principal mountains, with the elevation of the snow line. The height of the snow line varies according to latitude. It is highest in the vicinity of the equator, and it descends lower and lower towards each pole, where it is found at the earth's surface. The mean elevation of the snow line at the equator is 15,000 feet.

* The Stratified rocks are sometimes classified as Primary, Transition, Secondary, Tertiary, and Recent.

The average elevation of mountain ranges and plateaus is indicated in the following manner: 6—9000 feet; as, for example, *Sierra Nevada*, which is from 6 to 9000 feet above the level of the sea. The height of the principal culminating points is also given in feet.

To each map is appended a section showing the most important elevations and depressions of each country.

MAPS X. AND XI.

These maps exhibit the regions visited by earthquakes, the principal volcanic districts, and the localities of the most useful minerals.

There are supposed to be about 300 volcanoes on the earth, about two-thirds of which are situated on islands, the remainder being confined to the continents. Their distribution is stated in the following table:—

	On continents.	In islands.	Total.
Europe - - -	4	20	24
Asia - - -	17	29	46
Africa - - -	2	9	11
America - - -	86	28	114
Oceanica - - -	—	108	108
			<hr/> 303 <hr/>

MAP XII.

This map shows the great ocean currents and the river systems of the globe. The oceans and seas into which the rivers respectively fall are indicated by the different colours. In Tartary is a district denominated *Region of Inland Drainage*, because none of the rivers of this region find their way to any of the oceans, but are emptied into the Caspian Sea and the Sea of Aral, the great inland lakes of the Old Continent.

The *lines* which cross this map are *isothermals**, that is, *lines of equal heat*, and are drawn over places which have the same or nearly the same *mean annual temperature*.

Thus the isothermal line of 30° leaves the W. coast of America in latitude 61° , rises and declines in the interior, falling to lat. 53° on the shores of Labrador. It then ascends abruptly to lat. 74° in the Arctic Ocean, and passing around the North Cape of Europe, as abruptly descends to lat. 50° in the interior of Asia.

The figures attached to each curve indicate the mean annual temperature of the region traversed by it.

MAPS XIII. AND XIV.

These maps exhibit *isothermal lines of the months* of January and July, — the former being the coldest, and the latter the hottest, month of the year. The gradations of climate are shown by the various colours,—*deep red* indicating the *greatest heat*, and *deep blue* the *greatest cold*. The intermediate degrees are shown by means of the following colours — *light red, pink, green, brown, and light blue*.

The range of the January lines, in the northern hemisphere, extends from 80° to -40° , that is, to 40° below zero; whilst the range of the July lines is only from 90° to 40° .

The isothermal lines of January in the northern hemisphere, it will be seen, curve *upwards* in crossing the Atlantic and Arctic Oceans, and *downwards* in crossing the continents; while the *opposite* is the case with the lines of July.

The figures attached to the names of places in the maps indicate their mean January and July temperature in degrees of Fahrenheit, whilst the mean winter and summer temperature † of some of the principal cities, towns, &c., will be found in Tables that are appended

* Isothermal lines of annual temperature were first drawn by Humboldt.

† Lines of mean winter temperature are termed *isochimænal lines*; and lines of mean summer temperature *isothermal lines*.

to these maps. The difference in temperature of various places is thus seen at a glance. Thus :—

N. York, coldest month 25° , warmest month $73^{\circ}\cdot 13$; the difference in the *mean temperature of the coldest and warmest month* is therefore $48^{\circ}\cdot 13$; whereas the difference in the *mean winter and summer temperature* of the same place is $40^{\circ}\cdot 88$.

MAPS XIV. AND XV.

These maps illustrate the principal features of meteorology, showing the localities of the constant, periodical, and variable winds, and the distribution of rain over the globe.

The shading of Map XV. is in proportion to the amount of rain which falls annually; the darkest tints denote the districts in which the average annual quantity of rain is the greatest, whilst the uncoloured portions show the *rainless regions* of the earth.

The average annual quantity of rain that falls at various places may be seen from the following Table:—

San Luis de Maranhao in S. lat. 3°	is equal to	276 inches.
Sierra Leone - - - N. lat. 9°	- -	189 "
Edinburgh - - - N. lat. 55°	- -	24 "
Uleaborg - - - N. lat. 65°	- -	13 "

MAPS XVI., XVII., AND XVIII.

These maps relate to organic existence, or to the animals and plants distributed over the globe. They show the principal food plants, the regions in which they are produced, and the localities of the most important members of the Animal Kingdom.

The Table, in Map XVII., exhibits Humboldt's Zones of Vegetation, with the mean annual temperature, and the characteristic vegetation of each zone.

The Table of Zones is constructed on the same scale as the Map.

and extends both north and south of the equator. The zones are thus designated : —

I. Equatorial zone, extending from	-	-	0°	to	15°
II. Tropical zone	-	-	15°	to	23½°
III. Sub-tropical zone	-	-	23½°	to	34°
IV. Warmer temperate ditto	-	-	34°	to	45°
V. Colder ditto	ditto	-	45°	to	58°
VI. Sub-arctic	ditto	-	58°	to	66½°
VII. Arctic	ditto	-	66½°	to	72°
VIII. Polar	ditto	-	72°	to	90°

The *mean annual temperature* of each zone is placed above the characteristic vegetation, thus : 28° to 32°, &c.

The *vertical distribution* of plants and animals is clearly exhibited in Map XIX. The numbers at the sides of the Map show the elevation from 1000 to 28,000 feet ; and the figures at the bottom give the latitude, north and south, of both hemispheres.

It will be seen that animals are found at a greater elevation than plants ; thus, the Llama lives at an elevation of 13,000 to 16,000 feet, the Cashmere goat at the height of 15,000 to 17,000 feet, whilst the Condor of the Andes soars to the height of 20,000 feet.

MAP XX.

This map illustrates the distribution of the leading races of men; the colours showing the countries and regions respectively occupied by the six great races, whilst the peculiarities of each are clearly exhibited in the engravings which contain types of the leading races of the human family.

I. *The Iranian* or Caucasian race* occupies western, and part of southern Asia, eastern and northern Africa, Hindostan, and Europe,

* Iranian, from Iran, ancient Persia.

with the exception of Hungary and Turkey. The white population of America is included in this division.

II. *The Tartar, Mongol, or Turanian* race*, includes all the nations of Asia east of the Caspian Sea and the Ganges, *with the exception of Malacca*. It embraces also the Laplanders and Finns, in Europe, the Aborigines of Siberia, and the Esquimaux from Greenland to Behring's Straits.

III. *The Malay race* comprehends the inhabitants of Madagascar, Malacca, Malaysia, the greater portion of Polynesia, and part of Australasia.

IV. *The Ethiopian or negro race* is spread over the whole of Western, Central, and Southern Africa. It is also found in Madagascar, intermixed with the Malays, and in some of the islands adjacent to Asia.

V. *The American race* consists of the Aborigines of America, exclusive of the Esquimaux, who are descended from the Mongol tribes of eastern Asia.

VI. The *Papuans* are found chiefly in Papua or New Guinea, and in the islands and Archipelagoes around Australia.

The *Alforas* are found in New Guinea and Australia.

The mixed races in Mexico and South America have been produced by the intermingling of Europeans, African Negroes, Mongolians, Malays, and the indigenous races of these regions.

* Turanian, from Turan, a name given to Tartary and the countries beyond the Oxus.

IV. ETHIOPIAN OR NEGRO RACE.

African Negroes	-	-	-	-	-	62,983,000
Caffres	-	-	-	-	-	5,200,000
Hottentots	-	-	-	-	-	500,000
Total						68,683,000

V. AMERICAN RACE.

North American Indians	-	-	-	-	5,130,000
South American Indians	-	-	-	-	5,140,000
Carribees	-	-	-	-	17,000
				Total	10,287,000

VI. PAPUANS, OR ORIENTAL NEGROES.

Australians, Papuans, Alforas	-	-	-	950,000
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TOTAL OF EACH RACE.

Caucasians	-	-	-	-	-	418,956,000
Mongolians	-	-	-	-	-	406,470,000
Malays	-	-	-	-	-	32,500,000
Negroes	-	-	-	-	-	68,683,000
Americans	-	-	-	-	-	10,287,000
Papuans and Alforas	-	-	-	-	-	950,000

Total population of the globe 937,846,000

This varies from the estimate given by Balbi and some other authorities. Thus Balbi makes the population of the world to be 37,000,000; whilst the Weimar Almanac makes it to be 993,000,000.

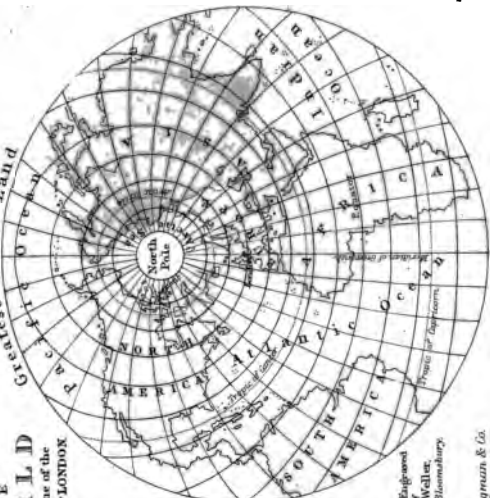
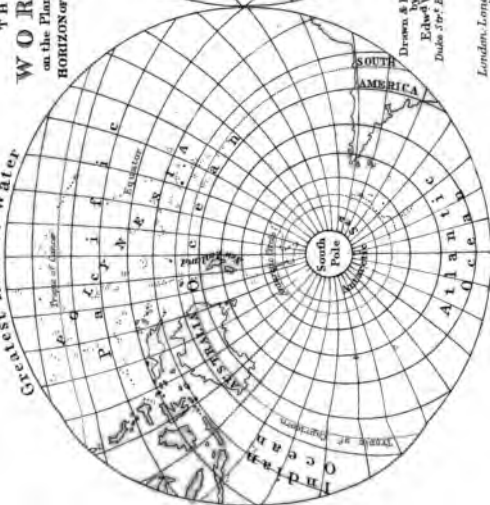
W. M'LEOD.

R. M. Asylum,
August, 1856.

THE
WORLD
on the Plane of the
HORIZON OF LONDON

Greatest Mass of Water

Greatest Mass of Land



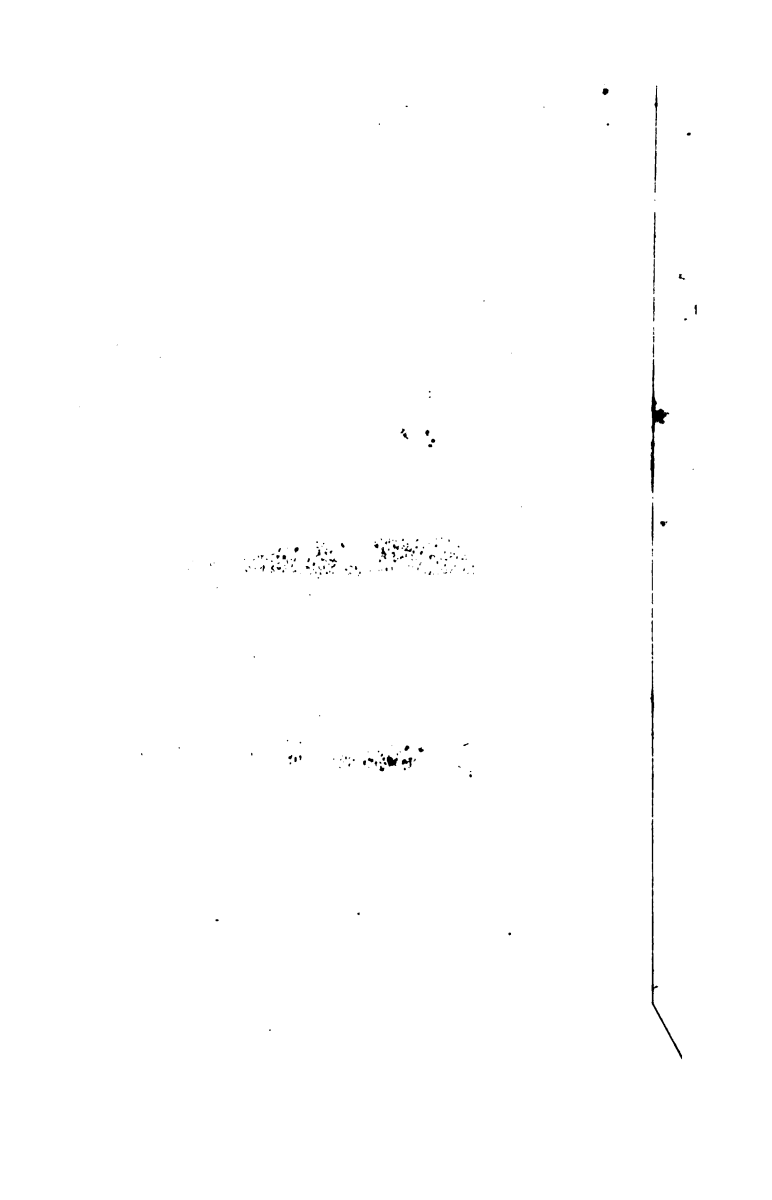
Drawn & Engrossed
by
Edwd. Waller,
Duke St. Bloomsbury

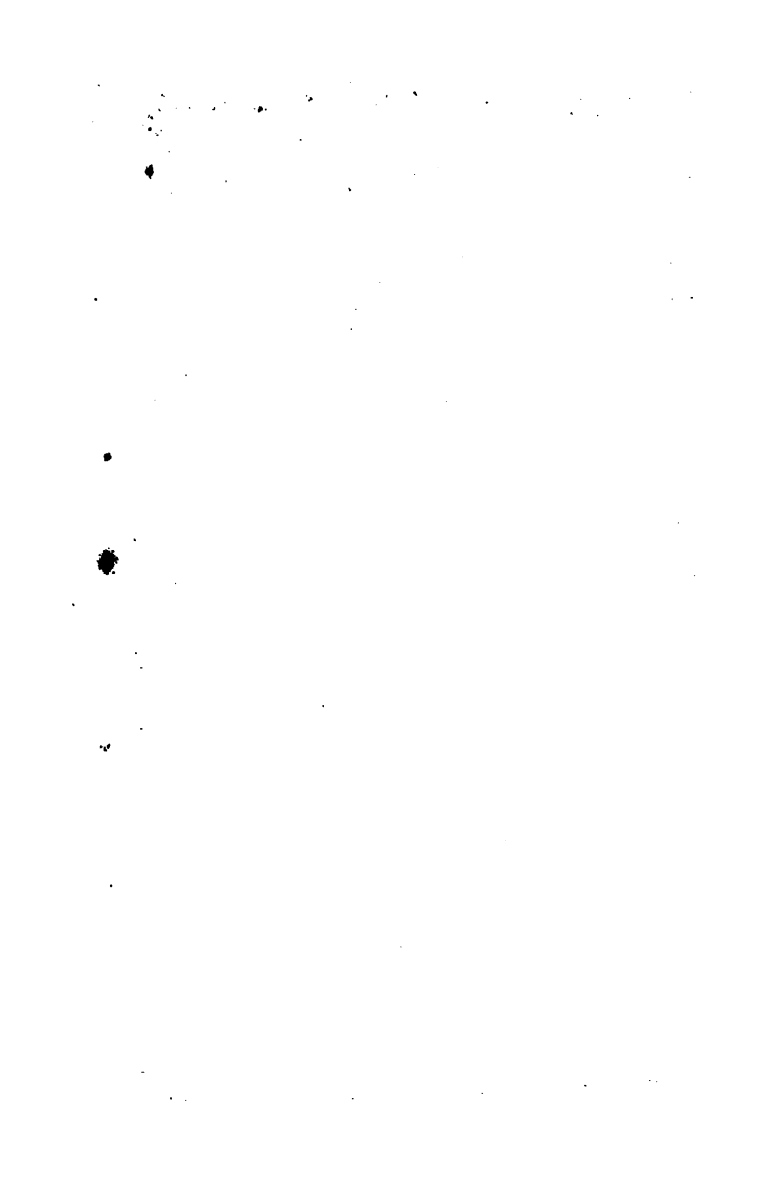
London, Longman & Co.

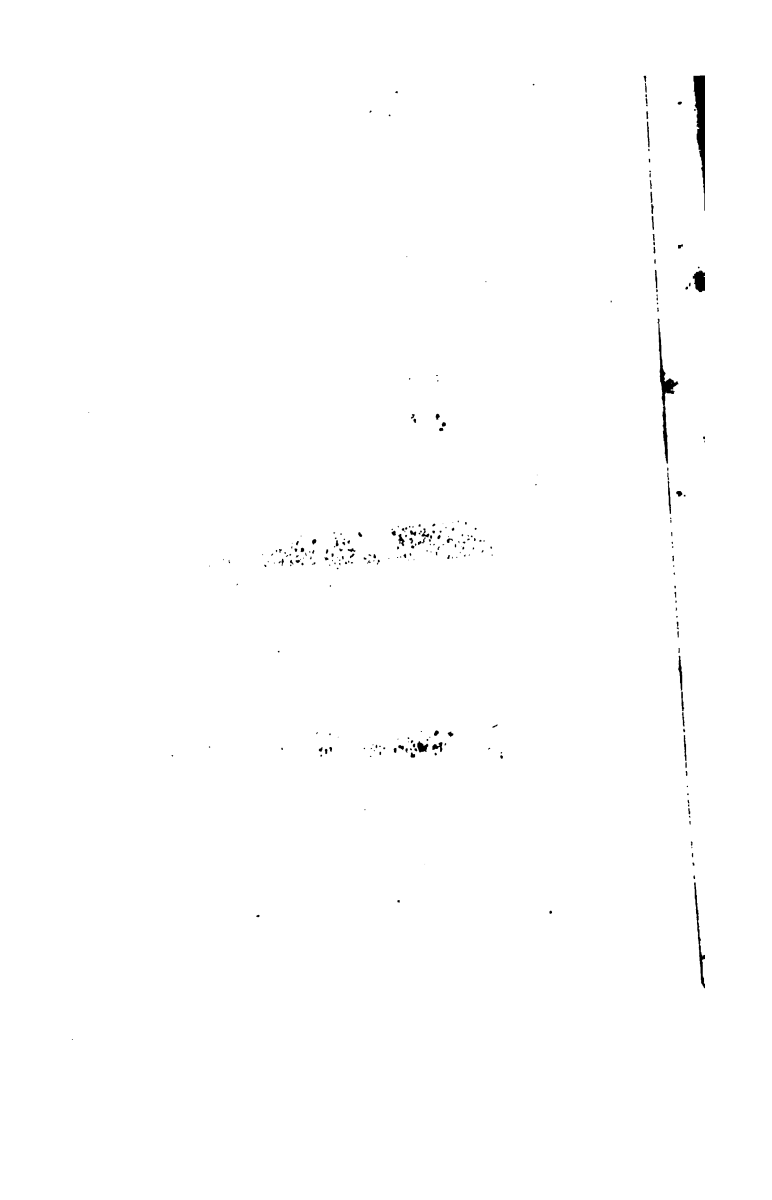
SECTION OF THE EARTH'S CRUST

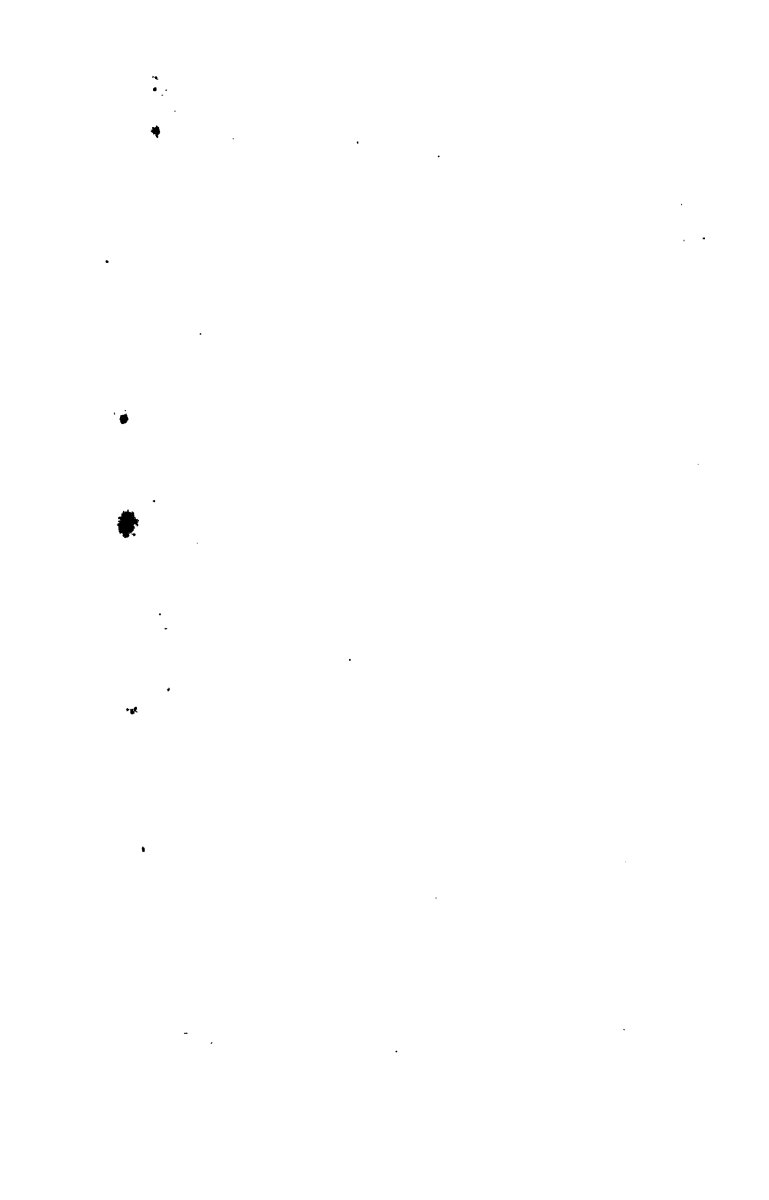
Showing the Geological Formations.

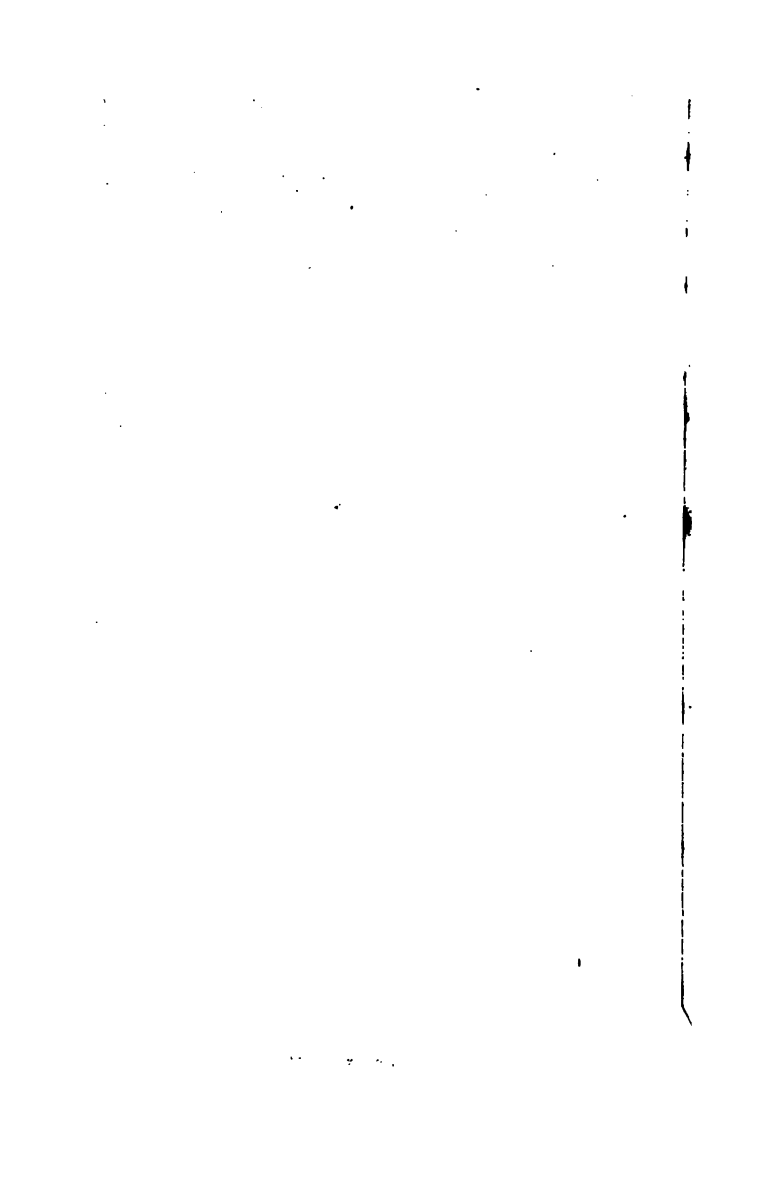
EPOCHS & FORMATIONS			SYSTEMS	
F O S S I L I F E R O U S	R O C K S	G R O U P S		
		Modern Deposits <i>Clays, Sands, Gravels, Peat-mosses</i>		Post Tertiary
		Pleistocene or Drift <i>Fossiliferous Clays &c.</i>		Upper Tertiary
		Pliocene <i>(Red Grag &c.)</i>		Tertiary
		Miocene <i>(Coraline Grag)</i>		Middle Tertiary
		Eocene <i>(Freewater Beds, Bagshot Sand, London Clay &c.)</i>		Lower Tertiary
		<i>(Chalk & Chalk Marl)</i> <i>(Upper Greensand & Gault)</i>	Upper	Cretaceous
		Cretaceous <i>Lower Greensand</i> <i>Kentish Rag</i>	Lower	
		Wealden <i>Weald Clay, Hastings Sand, Purbeck Beds</i>		O O L I T I C
		Upper Oolitic <i>Portland Stone, Kimmeridge Clay</i>		
P A L E O Z O I C	R O C K S	Middle Oolitic <i>Corall Rag, Oxford Clay</i>		
		Lower Oolitic <i>Cornbrash</i> <i>Great Oolite</i> <i>Fullers Earth</i> <i>Yellow Sand</i>		
		Lias <i>Alum Shale, Marlstone</i> <i>Lias</i>		
		Trias or Upper New Red Sandstone <i>(Variegated Marls & Sandstones)</i>		Triassic
		Permian <i>Magnesian Limestone, Lower New Red Sandstone</i> <i>Coal Measures</i>		Permian
P A L E O Z O I C	R O C K S	Millstone Grit <i>Carboniferous Limestone</i>		Carboniferous
		Devonian or Old Red Sandstone		Devonian
		Upper Silurian <i>Tilestone, Ludlow Rocks, Wenlock Limestone</i>		S I L U R I A N
		Lower Silurian <i>Caradoc Sandstone, Llandovery & Bala Beds</i>		
		Upper Cambrian <i>Feshlog Slates, Lingula Flats</i>		C A M B R I A N
		Lower Cambrian <i>Barlech Grits, Llanberis Slates, Longmynd</i>		
A Z O I C	R O C K S	Metamorphic Rocks <i>(Quartz, Mica, Gneiss)</i> <i>Clay Slate</i>		
		Igneous Rocks <i>(Traps, Granite &c.)</i>		







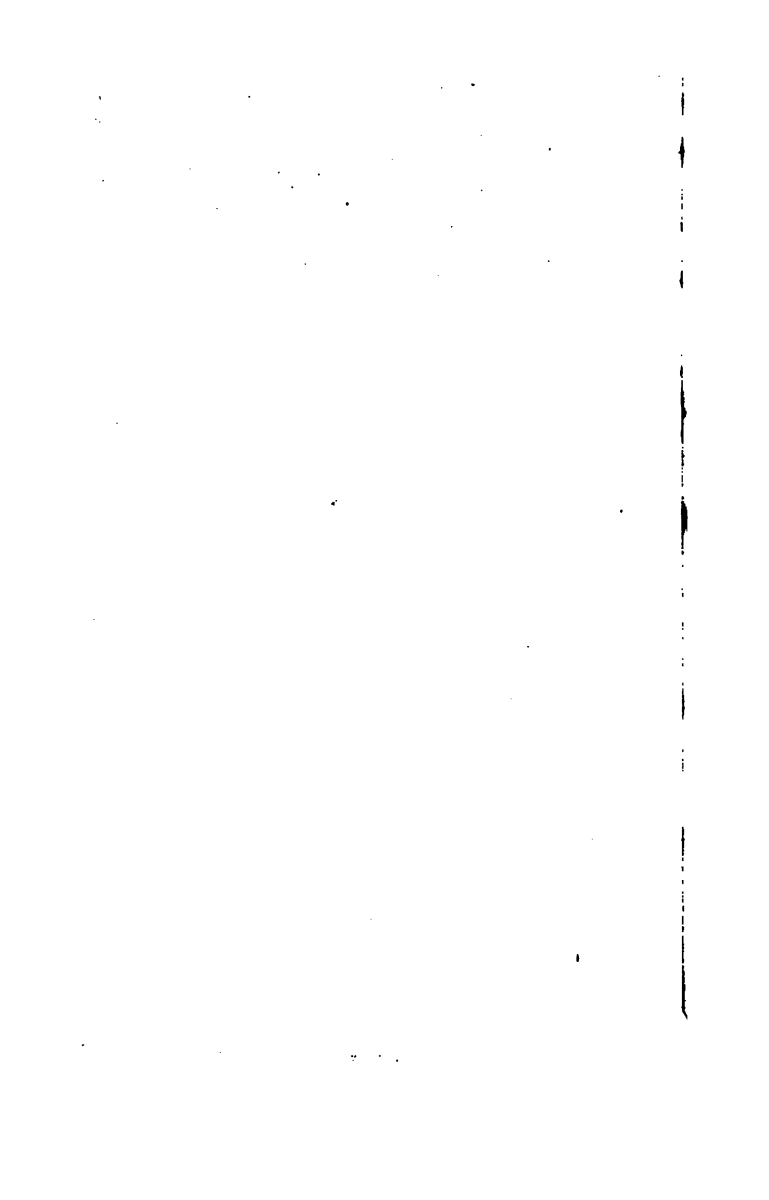




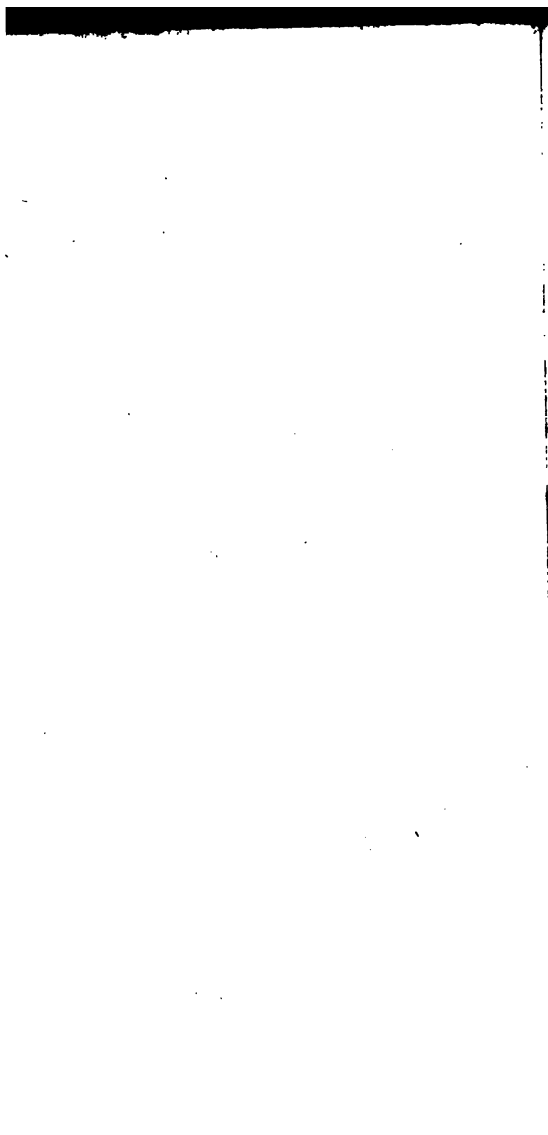








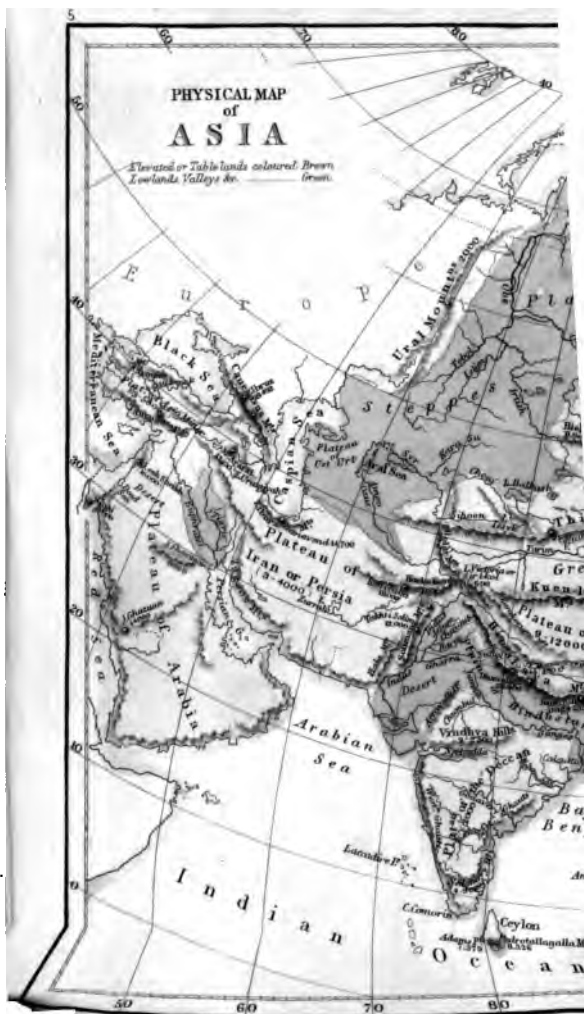


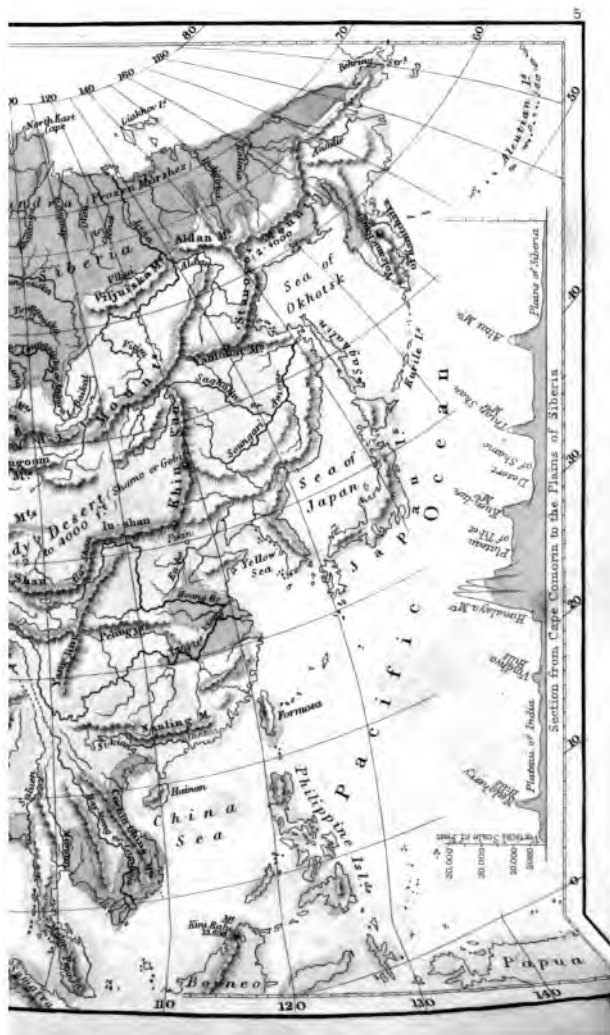


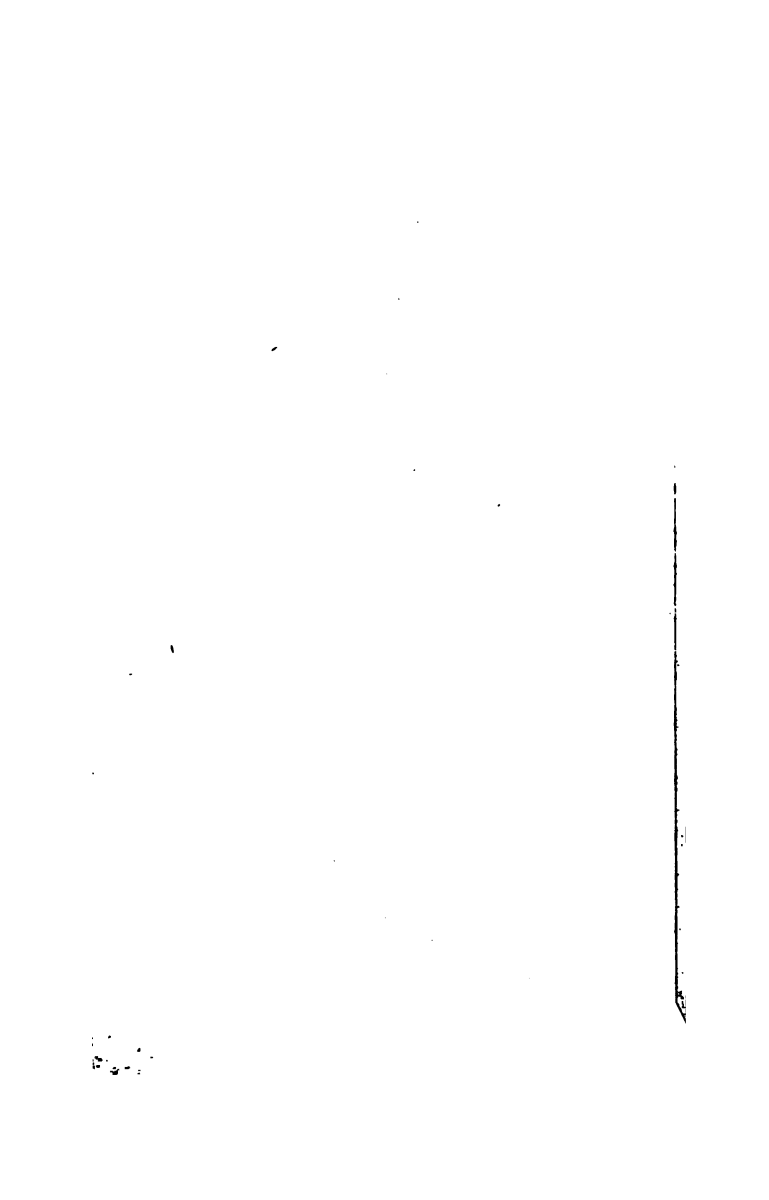


PHYSICAL MAP of ASIA

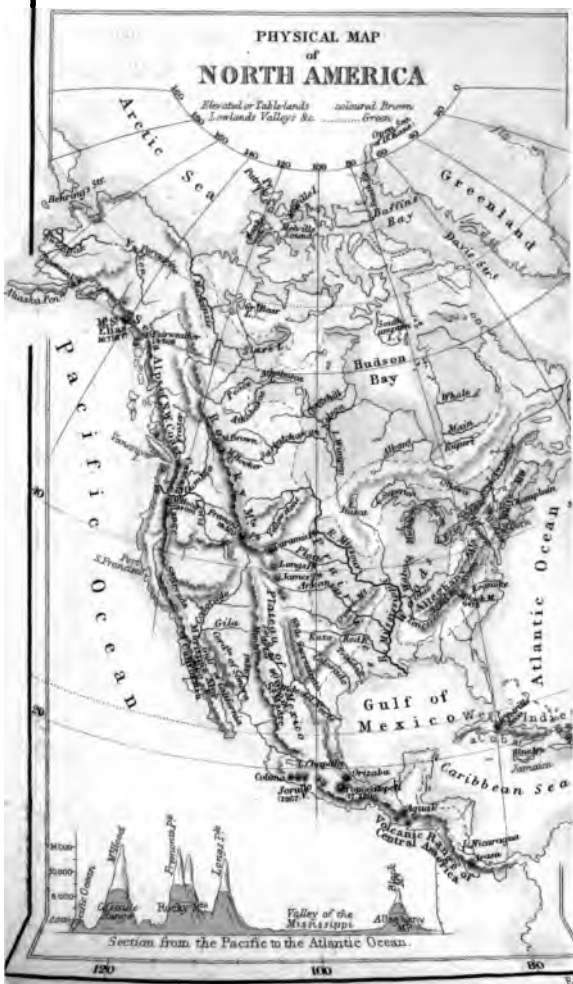
Elevated or Table lands colored Brown
Lowlands Valleys &c. Green

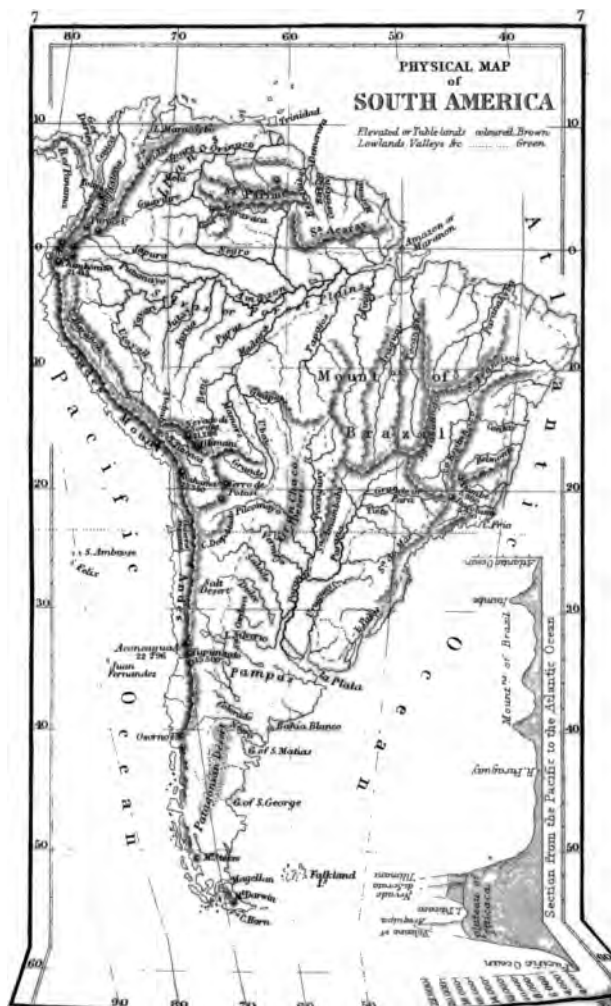












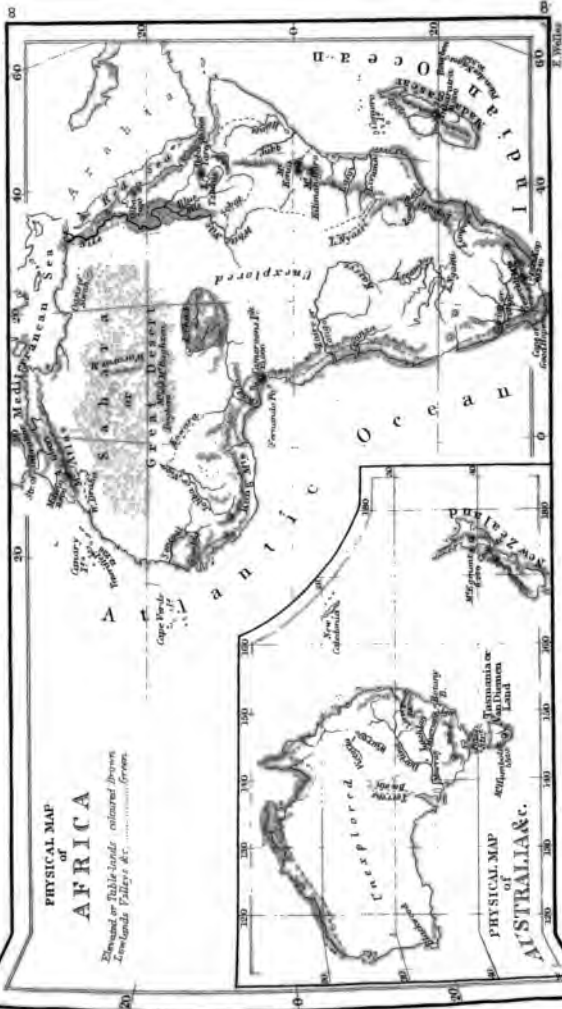


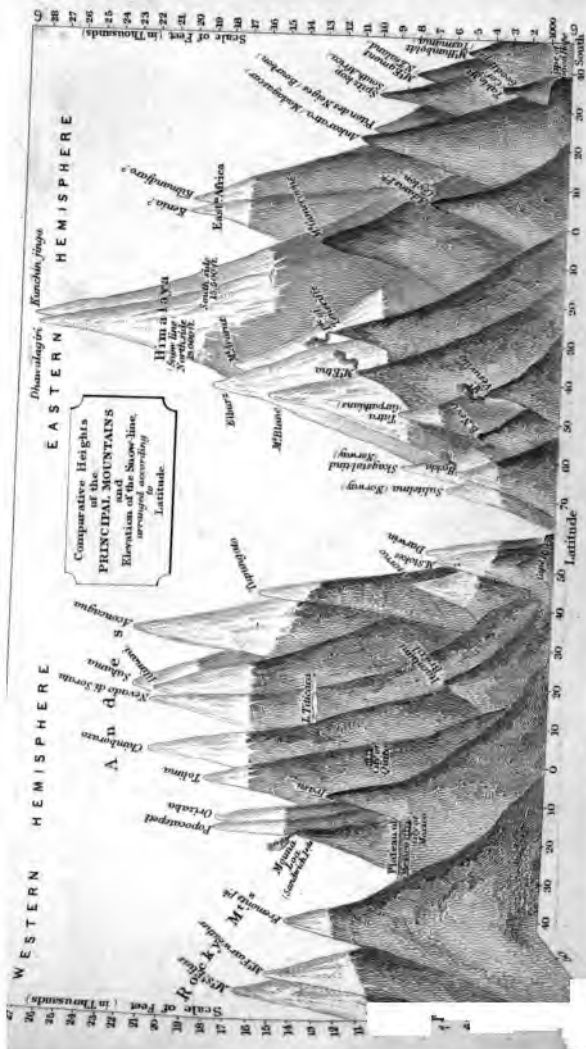


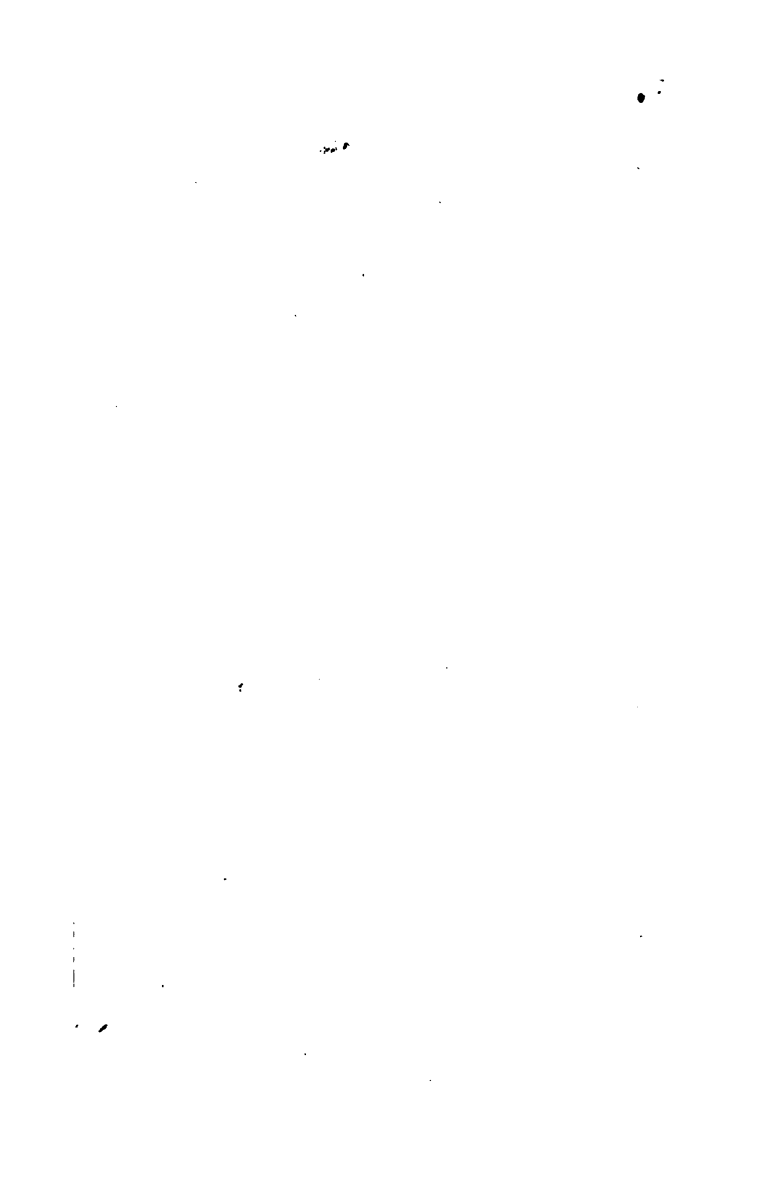
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PHYSICAL MAP of AFRICA

Shaded or Table lands coloured brown
Low-lands Valleys &c. from

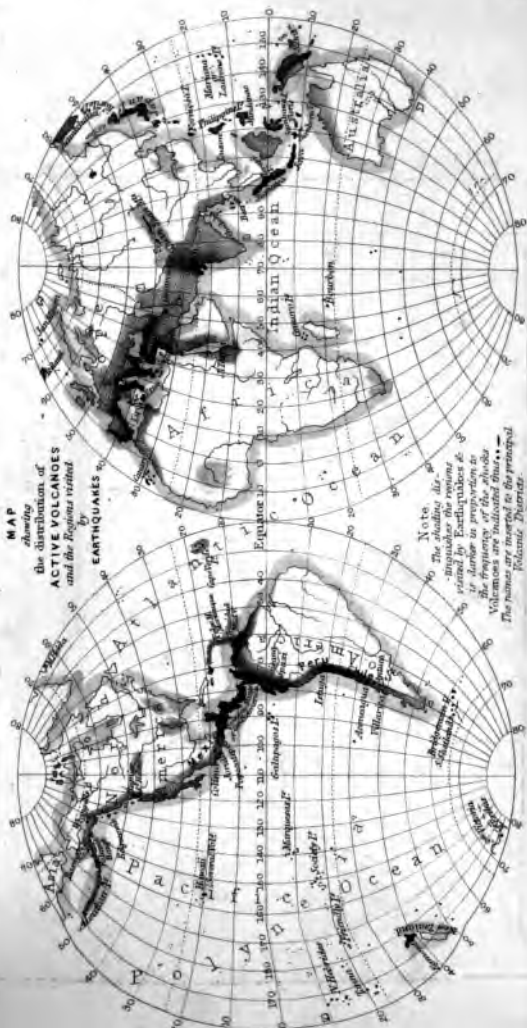








MAP
showing
the distribution of
ACTIVE VOLCANOES
and the Regions visited
by
EARTHQUAKES



Note.
The shading dis-
tinguishes the regions
visited by Earthquakes &
is further in proportion to
the frequency of the shocks.
The names are indicated thus: —
Volcanic Districts.

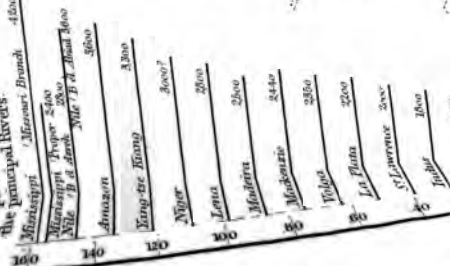
Note
The high lines crossing the Map are
Isothermals of Mean Annual Temperature
The figures attached indicate degrees of
Fahrenheit

ARCTIC OCEAN

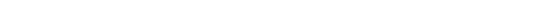
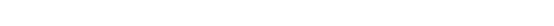


Line of Mean Temperature of the Ocean

Comparative Lengths of
the principal Rivers

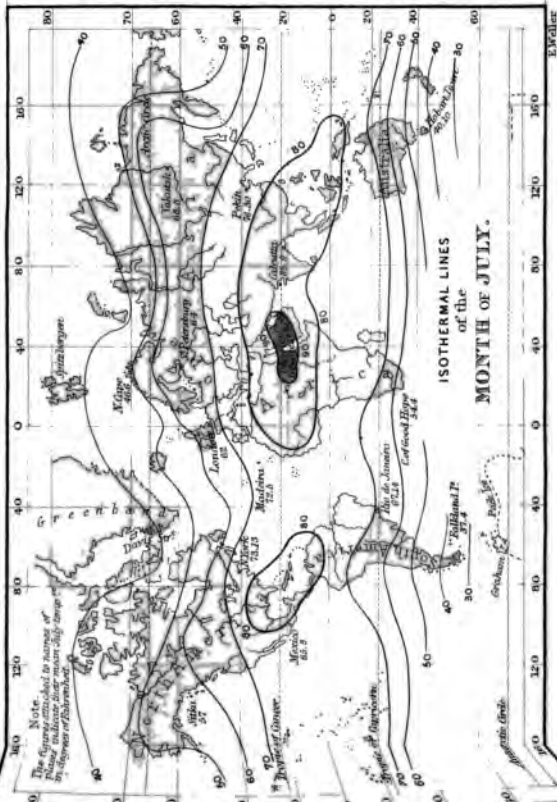


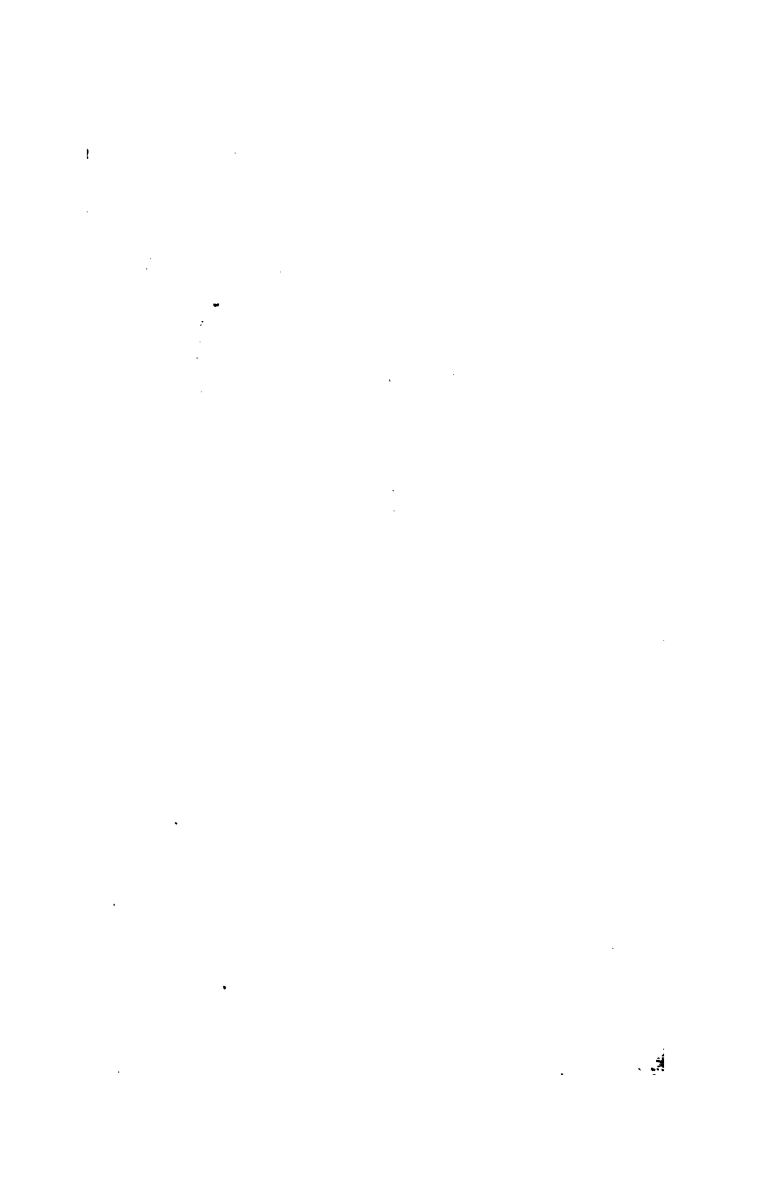




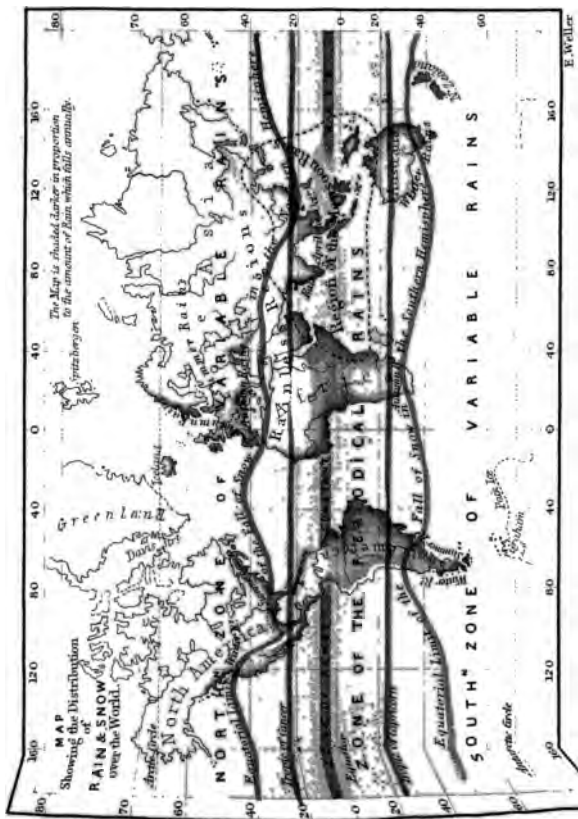
Mean
Winter & Summer
Temperature,
of some of the principal
Places in the Southern
Hemisphere.
Winter, generally, June,
July, & August.
Summer, 1st Dec^r, Jan^r,
& Feb^r.

	Winter	Summer
Melbourne.....	45°	64°
Adelaide.....	56° 40'	72°
Hobart Town.....	42° 15'	68°
Auckland.....	51°	67°
(N. Zealand)		
Batavia.....	78° 40'	78° 50'
Catmandu Hope.....	54° 40'	67°
S ^t Helena.....	58° 40'	68° 40'
Lo ^r Bourhon or Reunion.....	72° 30'	80°
Quito.....	59° 30'	77° 40'
Rio Janeiro.....	68° 60'	79° 15'
Monte Video.....	57° 30'	77° 30'
Lima.....	68°	77° 60'
Falkland I ^s	40°	55° 30'
Sumatra (Java).....	80° 75'	81° 20'

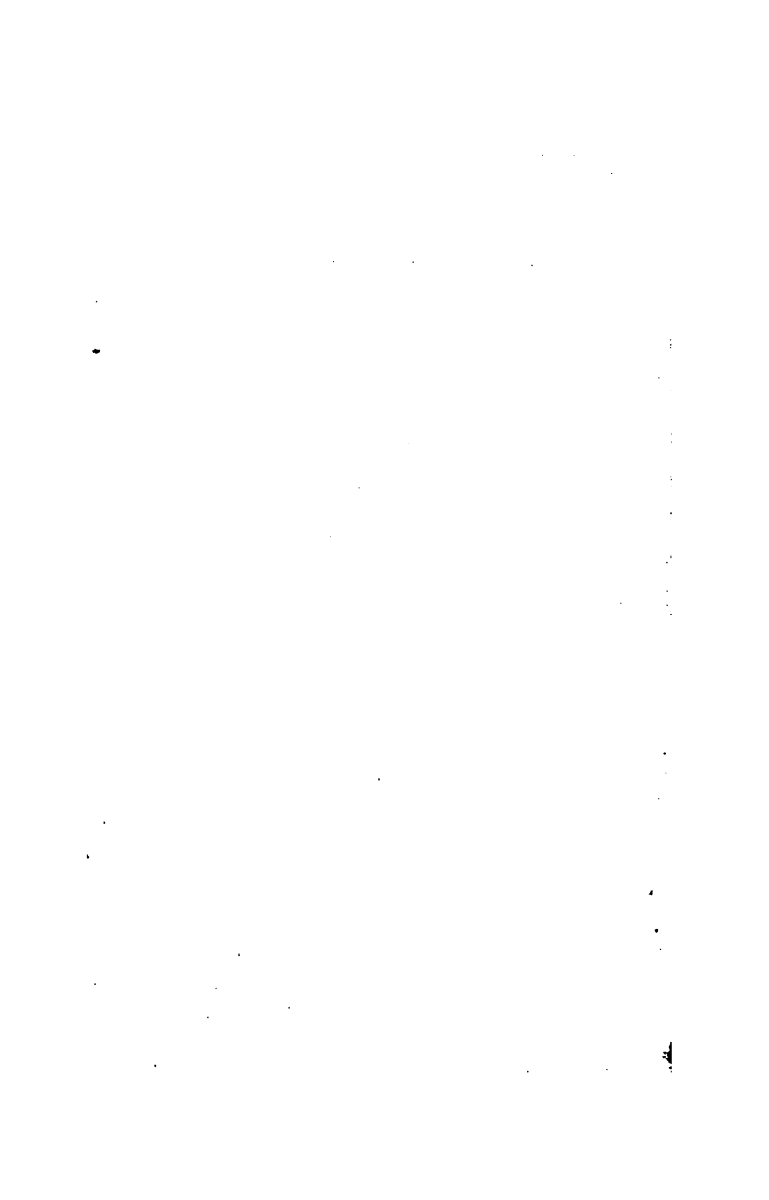




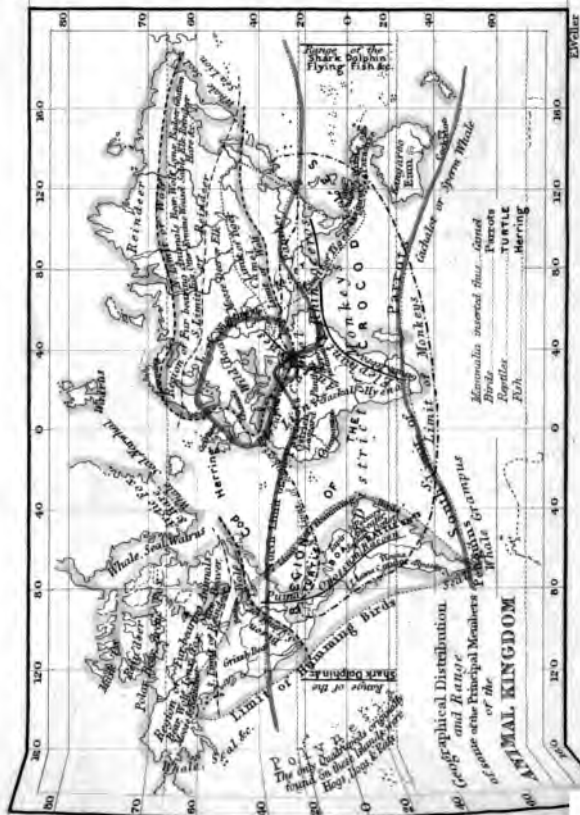
Section of a hill showing the formation of Springs.



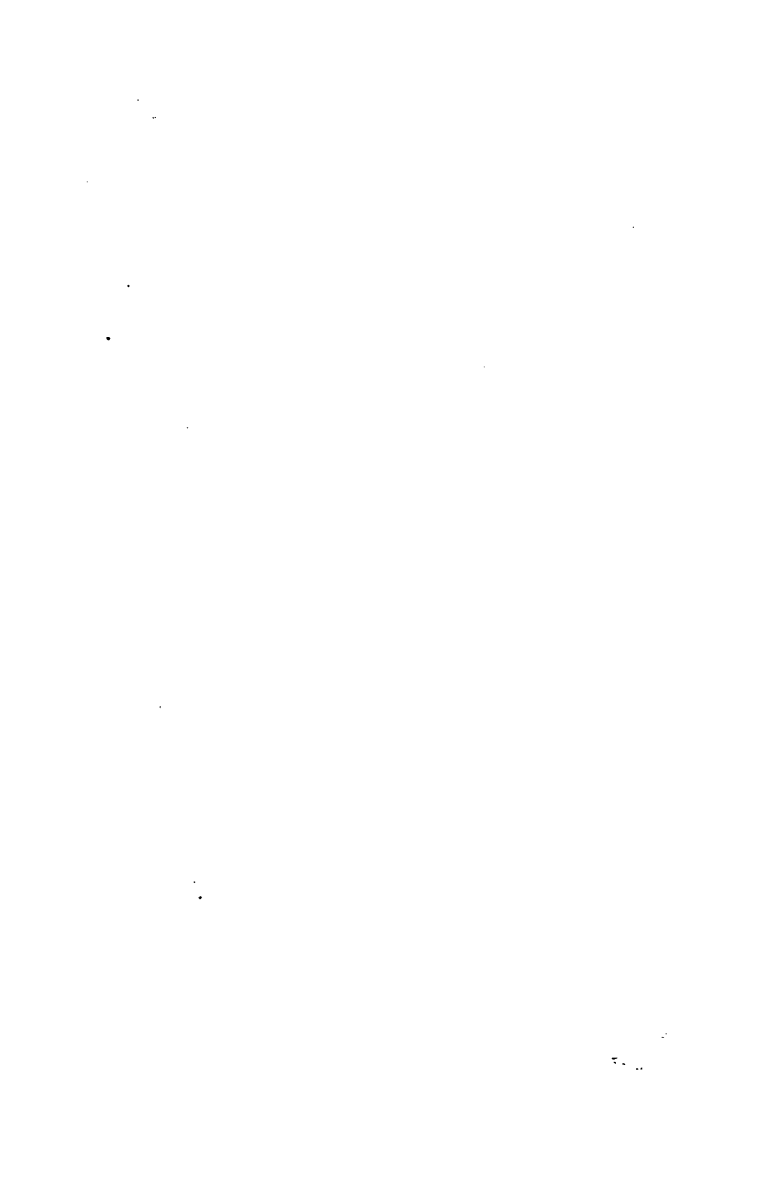




Lagoon Island or Atoll



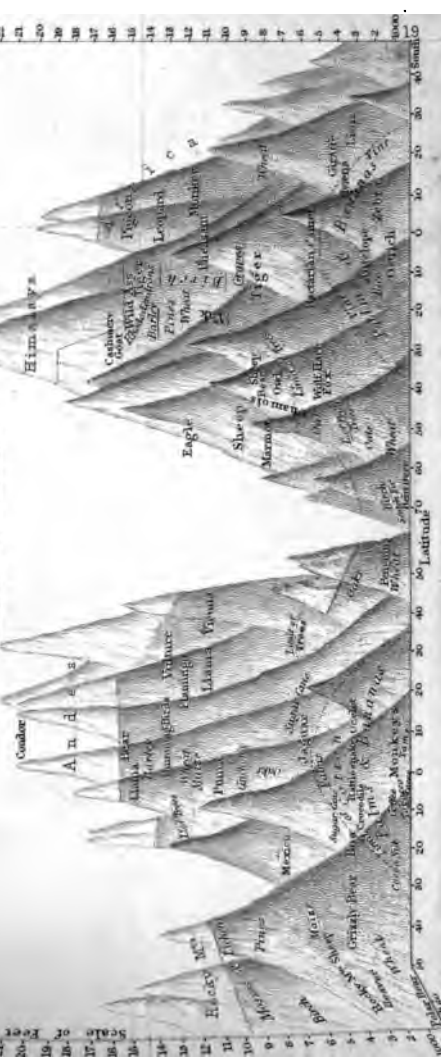




WESTERN HEMISPHERE EASTERN HEMISPHERE

Vertical Distribution.

PLANTS & ANIMALS



Caucasian

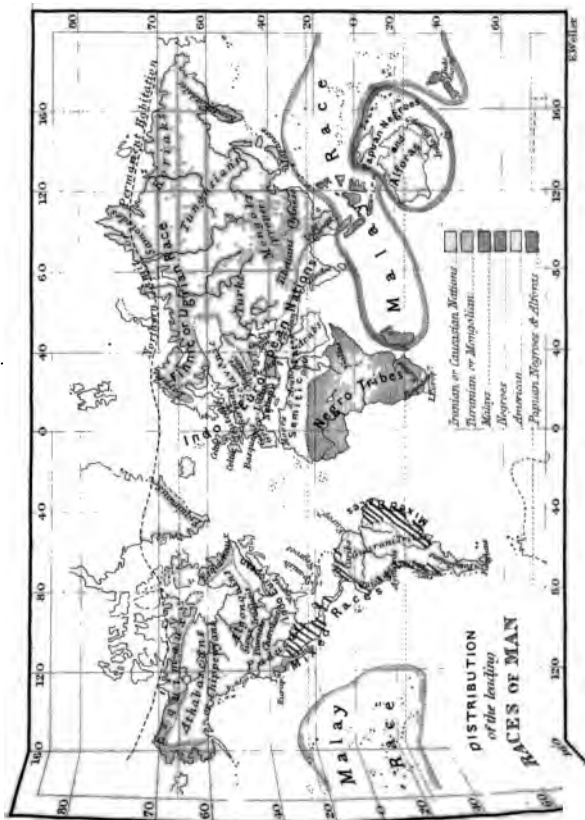
Mongolian

Malay

Negro

American

Alfora



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